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FOOD OR FUEL?

by Rowan Shirkie

The economic hardships caused by rising energy prices have set many countries scrambling to develop alternative sources of energy to oil. Perhaps the most promising prospect is alcohol fuel from plants.

The crops currently considered most suited to energy production are sugarcane, sweet sorghum, maize (corn) and other grains, and starchy root crops such as cassava.

But agriculture is already under considerable pressure simply to produce enough food to feed the world's burgeoning population. A Study by the Food and Agriculture Organization of the United Nations (FAO), Agriculture: toward 2000 estimates that to meet the growing demand for food, industry, and export, agriculture in developing countries would need to grow at a rate almost 40 percent faster than in the past.

Warns Lester Brown, director of the Worldwatch Institute: "The stage is set for direct competition between the affluent minority, who own the world's 315 million automobiles, and the poorest segments of humanity, for whom getting enough food to stay alive is already a struggle.

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Dr Joseph H. Hulse, director of agriculture, food and nutrition sciences for Canada's International Development Research Centre (IDRC), is more specific. He says: "In a world in which the growth of demand for edible cereal grains is outpacing the rate of increase in grain production, and in which 500 million people -- more than half of them children under five years of age -- are malnourished, it appears wicked for the governments of the major cereal producing nations to contemplate the conversion of their surpluses to ethanol in order to satisfy the appetites of their automobiles."

Countries like the USA, Brazil, and Thailand, which export a considerable proportion of their food production, and are dependent on oil imports, are most interested in the potential of energy cropping. Should the production emphasis in exporting countries shift towards fuel rather than food, the amount of food available on the world market for food-deficit countries would be reduced sharply. Prices would also rise, and the poor, who already spend a large part of their income on food would suffer the most.

Energy cropping may also compete for land, water, fertilizer, credit, and all the other inputs that go into food production. It is here that critics of alcohol fuels feel the real crunch may come, if fuel crops displace food crops or impoverish soil and water resources.

The dangers are inherent in the nature of the distilling operations and the types of crops used. Sugarcane production requires prime land, and is most suited to large-scale operations. Another agroindustry based on a feedstock like sugarcane could only lead to further concentrations of land in the hands of the rich or multinational corporations with the large amounts of capital needed to finance transition to ethanol production in the quantities needed.

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Brazil was importing 85 percent of its oil, spending an estimated $US6.5 billion annually in 1979. The outlay would certainly have been even greater but for the savings generated in the early stages of a national alcohol fuels programme begun in 1975. Brazil has also begun manufacturing cars that operate exclusively on alcohol. The goal of the programme is complete automotive fuel self-sufficiency, and Brazil expects to reach that goal by the year 2000 when ethanol production should reach 70 billion litres a year.

The programme is based on sugarcane. To achieve self-sufficiency on this route, Brazil will need to plant almost 3 percent of its land area (7 percent of arable land) to sugarcane. And at that point, Brazil will be growing more sugarcane than the rest of the world.

While the desire for energy independence is the driving force behind the alcohol programme, Brazil also plans to distribute benefits along the way to that goal. Sugarcane production lends itself to efficiencies of scale in concentrated, large-scale operations. On the other hand, cassava, a starch-rich root crop native to Brazil, is well-suited to small farm production and in marginal areas. Cassava ethanol operations may be a means to create employment and income opportunities for rural poor and extend development opportunities into areas where they are most needed.

By-products from alcohol production have been used as animal-feed supplements for many years. Proponents of energy cropping claim that the practice keeps cost low, and retains much of the food value within the agricultural system. But a US National Research Council study group found that there may be difficulties with the reuse of by-products from unconventional plant materials now being considered as fuel crops. Contaminants such as heavy metals and pesticide residues, and uncertainties

about the nutritional value of feeding requirements, limit the practicality of alcohol by-products.

Other developing countries are adopting fuel alcohol strategies. Cassava exports to European animal feed markets are Thailand's principal source of foreign exchange earnings. Almost all the crop is exported. The Thai crop is grown by small-holders on poor upland soils in the impoverished east and northeast of the country. Thus, the livelihood of millions of small farmers is tied to export markets. These markets may become increasingly uncertain as pressure is brought to bear by European producers to restrict trade in Thai cassava in favour of of regionally produced feedstuffs.

So although energy savings are important in Thailand as well, the stabilizing effect a domestic ethanol market for cassava would have on prices and incomes are a strong incentive for considering an alcohol programme.

Papua New Guinea is building a cassava-alcohol plant in the Baiyer River Valley. The plant is designed as a small operation, producing about 6,700 litres a day. It is reportedly a prototype for even smaller plants, introduced in producing areas as a new form of rural industrialization.

Kenya and Sudan are reportedly establishing alcohol distilleries to convert the by-products of sugar mills into fuel, and interest in adding fuel production capabilities is strong among many sugar-producing countries.

The potential conflict over land use may be "more imaginary than real" in countries with adequate agricultural resources, and where new land can be brought into production at a reasonable cost, according to Narinder S. Kohli. Chief of the fertilizer, refining, and other chemical

industries division of the World Bank, and member of the National Academy of Sciences panel studying the potential of alcohol fuels for developing countries Kohli says government policies aimed at reducing the cost of raw materials for biomass energy can reduce the competition between food and fuel crops.

But perhaps the soundest strategy for long-term fuel and food production lies in developing new technologies and processes that convert the woody cellulose parts of plants to alcohol. Crop residues and forest products can become an important source of fuel, if scientists can overcome the natural resistance to bacterial attack or degradation that cellulose contributes.

Food production itself is becoming increasingly dependent on energy inputs. The FAO study considered an increase of 107 percent in production levels both desirable and feasible. To achieve such an expansion, "very large increases in the use of energy-intensive inputs" would be required, and the FAO forecasters estimate commercial energy use in agriculture must rise by about 380 percent during the next 20 years. The bulk of this energy is consumed by farm machinery (about 51 percent) followed by fertilizer production (about 45 percent).

Rather than compounding an already serious problem, energy cropping may -- with enlightened management -- help the world scrape through a food and fuel crisis. For all his dire warnings, Lester Brown admits that "...a carefully designed alcohol fuel programme that gave farmers first priority in the use of ethanol for tractors, farm trucks, and irrigation pumps would help ensure future food supplies when oil supplies dwindle."

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